M40118.V03 PROCON Measuring Computer

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1. Functions

The measuring unit works with externally created test plans in MODAS/Procon NT format. A maximum of 512 test plans may be displayed, but not changed. Out of these 512 test plans, only one may be selected to be active. When selecting another test plan to be active, the measuring results of the previously used test plan remain saved. They will only be deleted after export of the measuring values.

Program functions:
- max. 8 measurement points, max. 8 measuring inputs (standard setup 4 measuring inputs)
- Display of measuring values: list, bar chart, single value card
- Monitoring of tolerance limits: for each measurement point LL, LCL, GOOD, UCL UL
- Internal data logger
- Import of test plans in MODAS/ProconNT format from USB storage device
- Export of test plans and measuring values on USB storage device
- AUTOZERO function
- Control interface for tool compensation

2. Construction

The PROCON measuring computer is available with the following computer models:
- Measuring computer A&V 8817.653.0 in table housing with 10.4" colour display and touchscreen
- Measuring computer A&V 8861.600.0 for control cabinet installation on top hat rail with VGA monitor output

Both computer models contain:

512MB RAM, 80GB hard disk,
USB connection for external storage device
PLC interface: 16 I/O via optocoupler, 4 measuring value inputs for inductive tracers
OPTIONS:
Extension to 8 measuring value inputs,
connection of external function keys,
control interface 8833.600.0 NEUE MAGDEBURGER / INDEX

<u>Webserver function for remote control:</u>
The unit has got a man-machine interface and acts as an internet server with an individual address. Status information as well as inputs and outputs are not carried out on the device, but via an external computer via ETHERNET interface and a browser program, e.g. Internet Explorer. The measuring device may be displayed through the PC browser program by entering its address. The measuring units contain their own firewall in order to repel unauthorized access via the ETHERNET interface.

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Front view of case with connection for external USB storage device:

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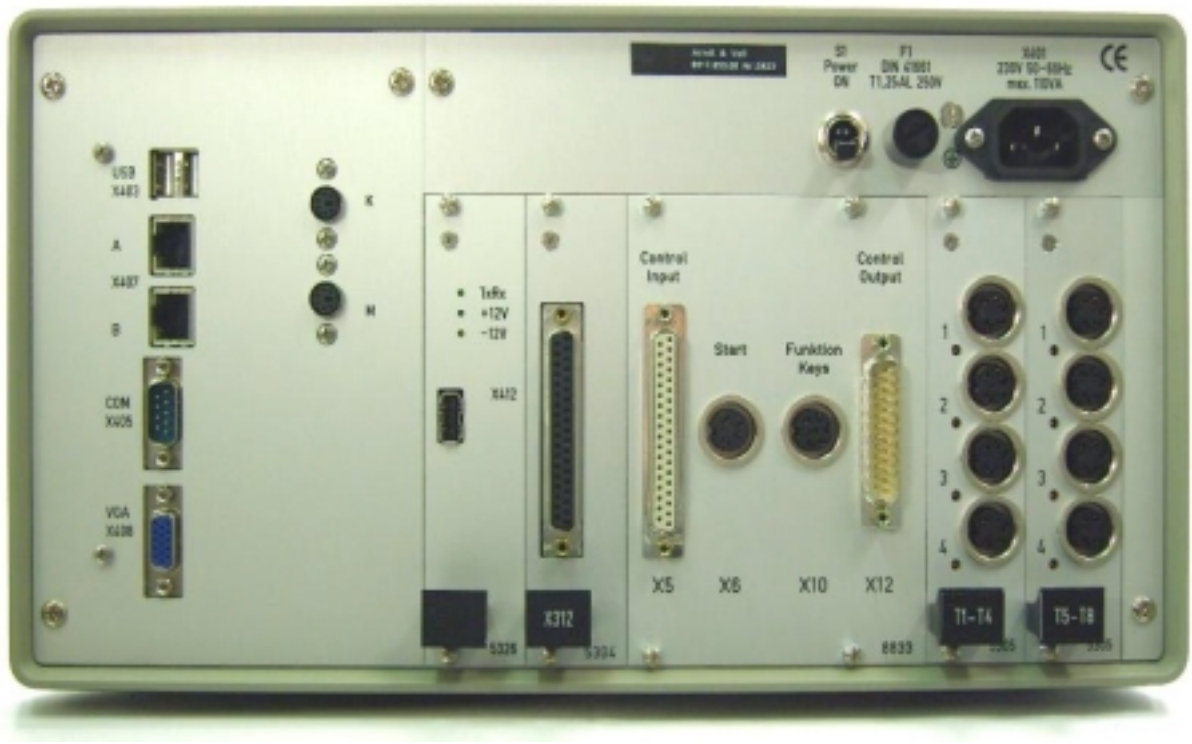
3. Connection elements

Back of case:



X401	Euro connector	power supply 115-230V/50-60Hz
X403	2x 4pol. socket	USB connection
X405	9pol. plug MIN D	Serial interface
X407	2x 8pol. socket	ETHERNET interface
X408	15pol. plug MIN D	Output VGA monitor
K	6pol. socket MINI DIN	PS2 keyboard input
M	6pol. socket MINI DIN	PS2 mouse input
X412	4pol. plug	Internal test socket
T1-8	8x 5pol. socket 680	Inputs for inductive tracers
X312	37pol. socket MIN D	Control inputs/outputs

Option NEUE MAGDEBURGER / INDEX:

X5	37pol. socket MIN D	Control inputs
X12	25pol. plug MIN D	Control outputs
X6	4pol. socket 680	Start input
X10	6pol. socket 680	External function keys

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4. Operating mode AUTOMATIC

Switch on measuring unit. After loading the program, the unit is in the operation mode AUTOMATIC and ready to operate.
By touching the keys or alternatively, with the external function keys, the requested display mode is selected.
Independent of the selected display mode, measurement and saving of the measuring value are carried out as soon as a transfer signal is given at the corresponding control input.
An exception is the function **automatic zeroing**. The unit displays that it is ready for measuring with the output signal **Busy**.
Depending on the test plan, this is either a separate signal for each measurement point or a collective signal for the simultaneous measurement of all measurement points.

Collective start	All inputs are measured simultaneously.
Chaotic	Each input has its own start signal. Only inputs with an active start signal will be measured. This function allows measurements without temporal coherence.

Particularities:

Measurements out of range/measurements out of plausibility:

If at least one measurement is out of range, the unit interprets the whole measurement as failure.
The measurement cycle will not be used for statistics and control.

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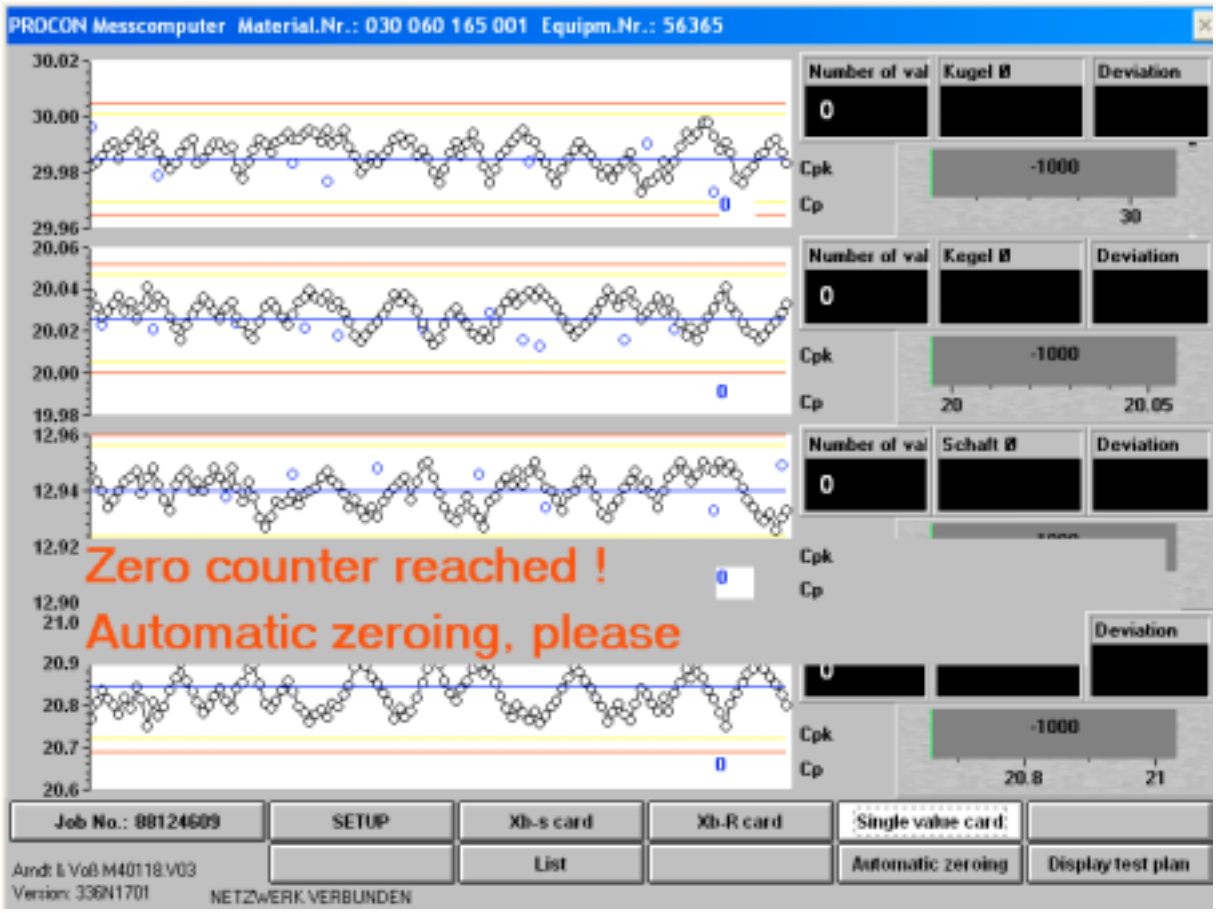
Forced zeroing after n units:

When forced zeroing is included in the test plan, the control signal BUSY as well as a warning message are set after the zero interval was reached.
After having carried out **automatic zeroing**, measuring may be continued.



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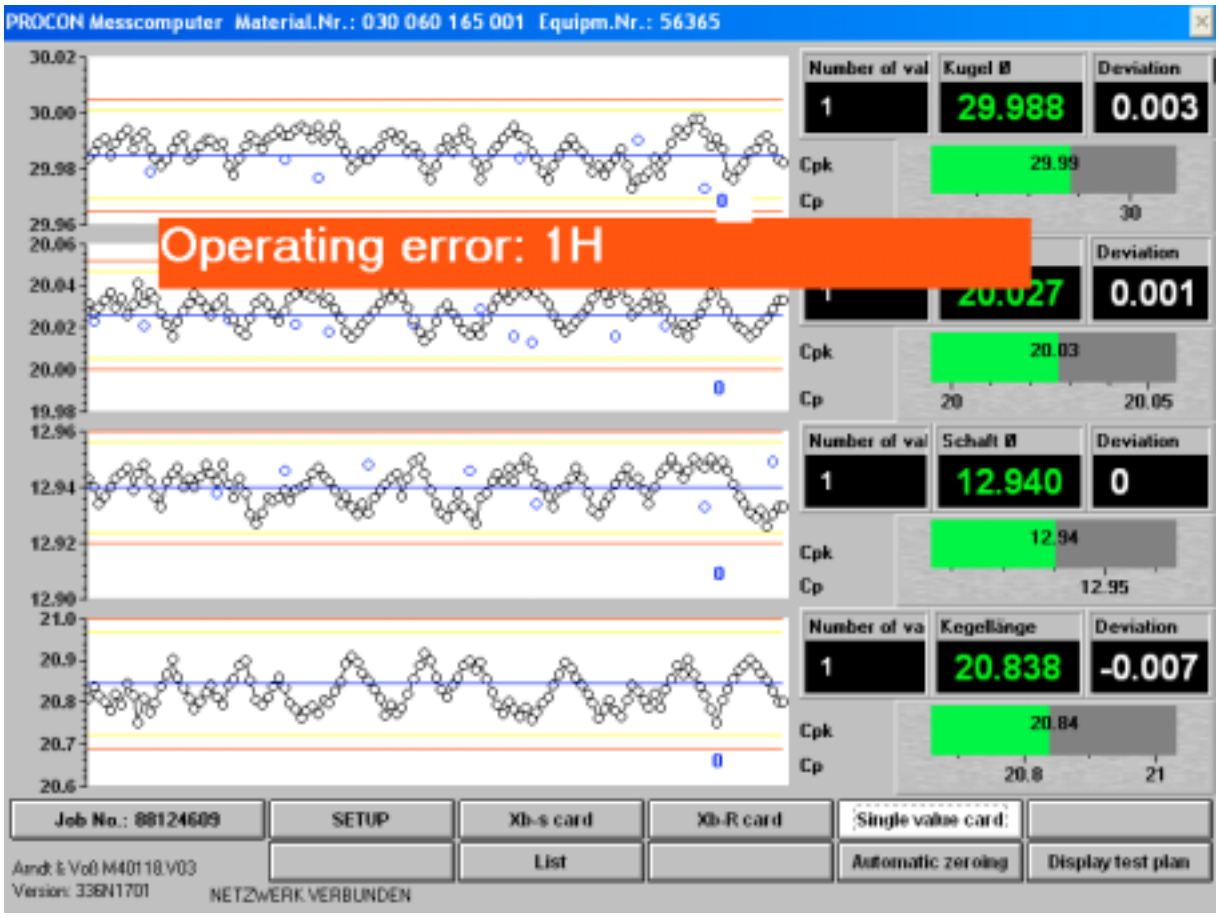
Operating error:

If a control interface for tool compensation is included in the test plan, in case of an error a warning message is set in the signal exchange with the machine control. Measuring may, however, be continued.
Meaning of the error message: xH xL

x = number of control output
H = timeout error of the signal acknowledge ON (waiting time > 2 s)
L = timeout error of the signal acknowledge OFF (waiting time > 2 s)



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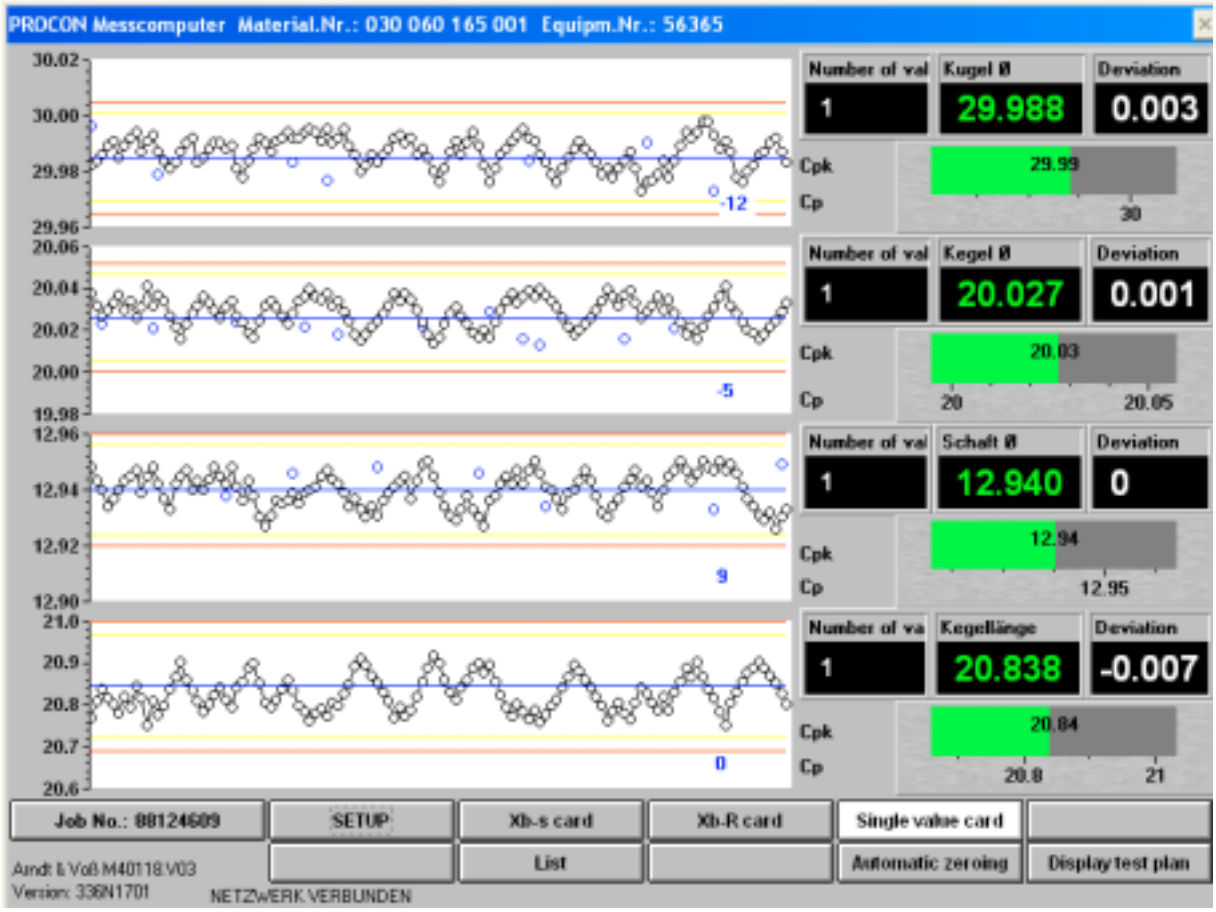
Basic setup in operating mode AUTOMATIC:

Single value card
The single value card shows the process characteristics of a measurement point with the last 125 measured values. The advantage of the single value card is that it is very easy to read. For process control the Xb-S quality card is recommended because it is more sensitive for changes in location and spread. The tolerance limits are marked as red graph, the control limits as yellow graph and the centre of the tolerance range as blue graph.

Bar chart
The bars show the last measured values of all measurement points within the tolerance range. This display mode is useful if it is to be checked how the working pieces lie within the tolerance range. For process control the use of quality cards is recommended.

Deviation
The deviation displayed on the right side of the monitor is the difference between the last measured actual value and the nominal value.

If a control interface is used, each readjust value output to the CNC machine is marked with a blue dot. The last issued readjust value is displayed at the right side of the diagram as blue numerical value.



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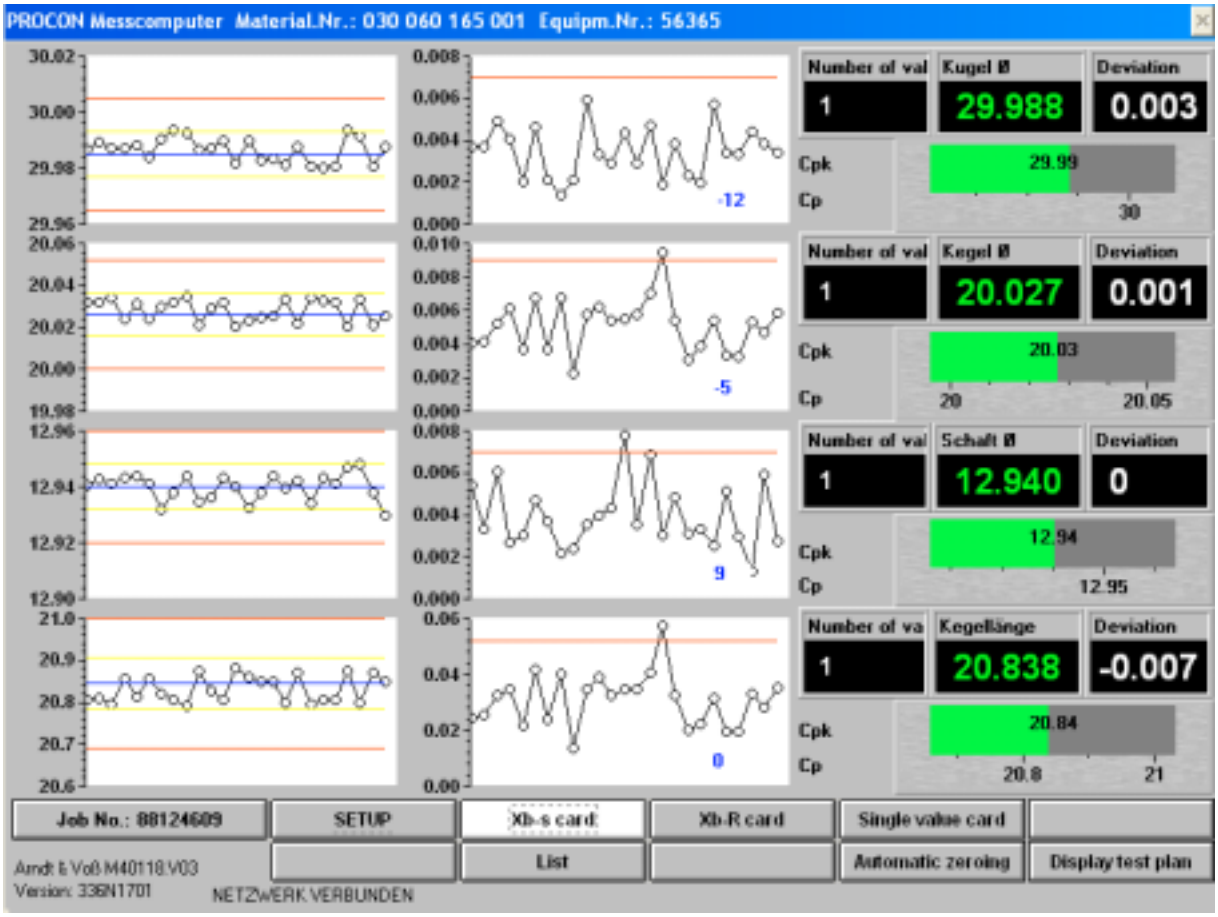
Xb-s card

The Xb-s card shows process characteristics of a measurement point with the last 25 sample results. For process control, the Xb-s quality card display is recommended as it reacts most sensitively to changes in location and spread.



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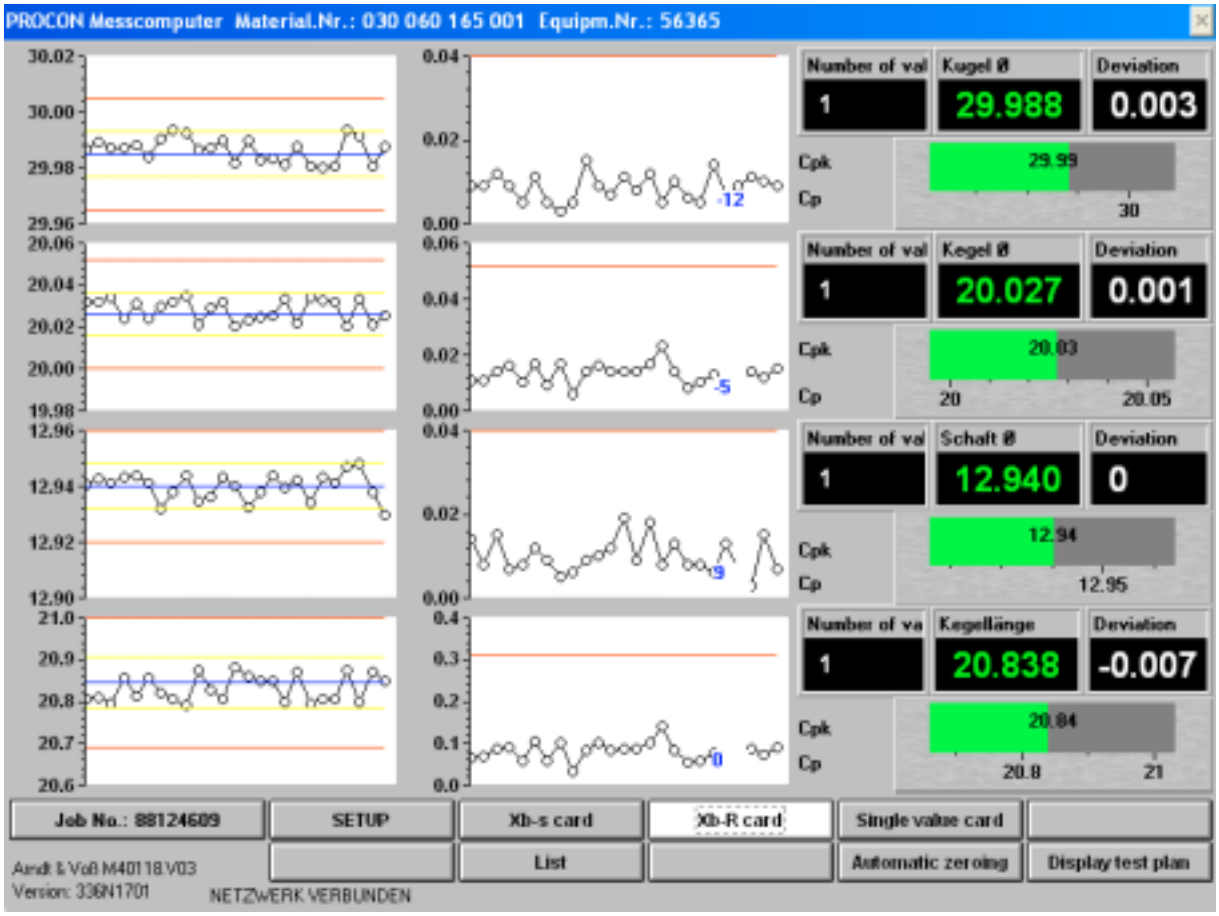
Xb-R card

The Xb-R card shows the course of the process of a measurement point with the last 25 sample results. For process control, the Xb-s quality card display is recommended because it is most sensitive for changes in location and spread.



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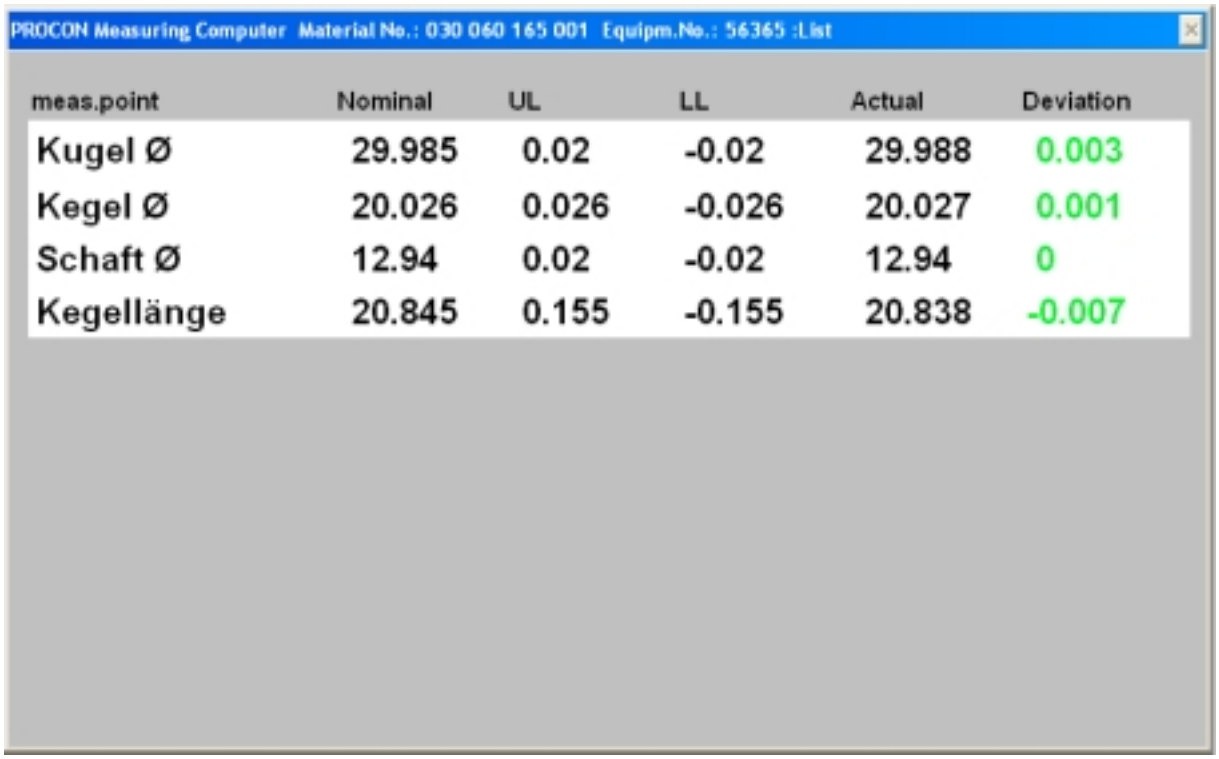
List
The list shows in a detailed numerical overview the last measuring values for all measurement points. This display is useful, if one specific measuring value is to be examined.
More frequent are the following output modes:
- quality card for process control
- bar chart for the measuring value display

Deviation Actual value - nominal value


PROCON Measuring Computer Material No.: 030 060 165 001 Equipm.No.: 56365 :List
meas.point Nominal UL LL Actual Deviation
Kugel Ø 29.985 0.02 -0.02 29.988 0.003
Kegel Ø 20.026 0.026 -0.026 20.027 0.001
Schaft Ø 12.94 0.02 -0.02 12.94 0
Kegellänge 20.845 0.155 -0.155 20.838 -0.007

Automatic zeroing (also possible in operating mode SETUP)
Automatic zeroing = offset adjustment
Automatic zeroing is necessary periodically after a fixed time or a number of produced units. With this function, the measuring unit determines a readjust value and carries out a system check at the same time.

readjust value = actual value – setup master

The readjust value is used to fine-adjust the tracer position and to compensate changes caused by temperature coefficients. Deviations bigger than the predefined max. correction range indicate failures.

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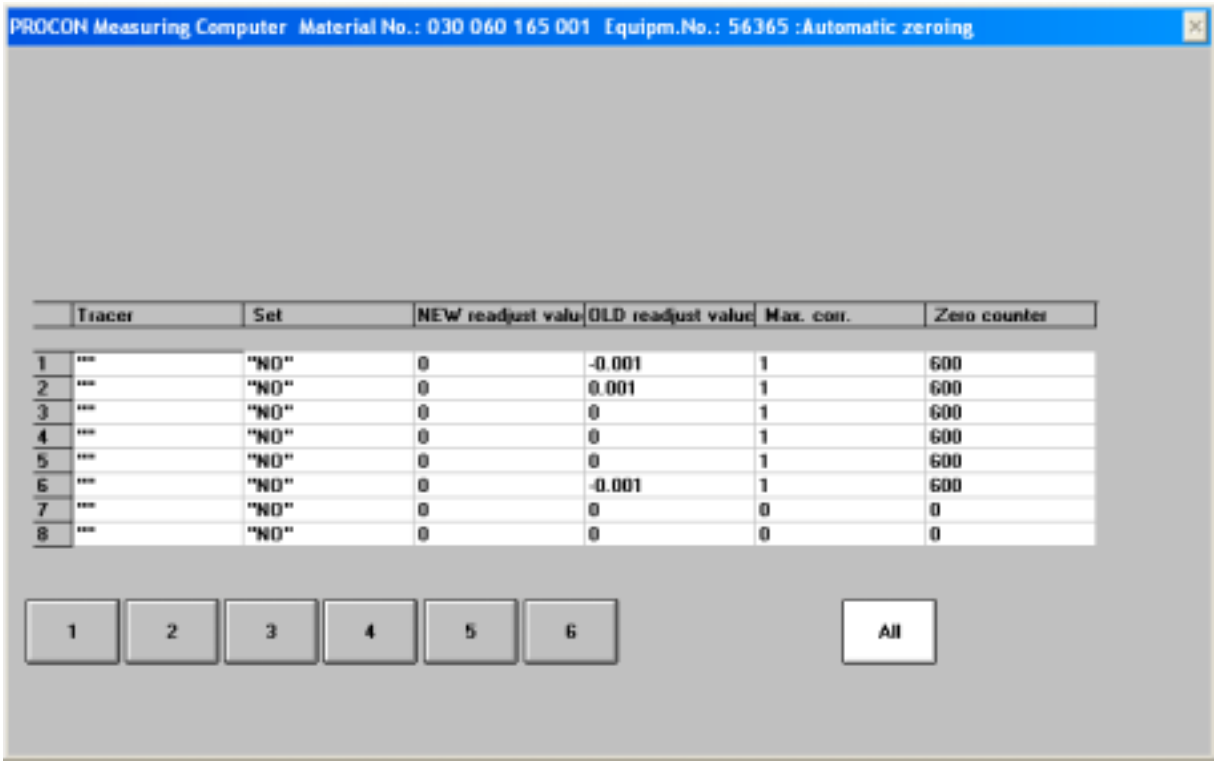
Process: insert setup master
set one or all tracers to zero

Set

Yes the measured value lies **within** the allowed max. correction range.
No the measured value lies **outside** the allowed max. correction range.
Please check whether the setup master is inserted correctly.
If a repeated zeroing does not result in **Set = Yes**, the corresponding tracer must be adjusted in **position tracer**.

Readjust value = Deviation of the tracer from 0

New Value of the current offset adjustment
Old Value of the previous use of the function "automatic zeroing"
A comparison between **New** and **Old** shows the changes over time.
In case of substantial deviations, zeroing should be repeated in order to prevent that a faulty measurement in automatic zeroing causes mesurement errors.


PROCON Measuring Computer Material No.: 030 060 165 001 Equipm.No.: 56365 :Automatic zeroing
Tracer
Set
NEW readjust valu
OLD readjust value
Max. corr.
Zero counter
1 "" "NO" 0 -0.001 1 600
2 "" "NO" 0 0.001 1 600
3 "" "NO" 0 0 1 600
4 "" "NO" 0 0 1 600
5 "" "NO" 0 0 1 600
6 "" "NO" 0 -0.001 1 600
7 "" "NO" 0 0 0 0
8 "" "NO" 0 0 0 0
1
2
3
4
5
6
All

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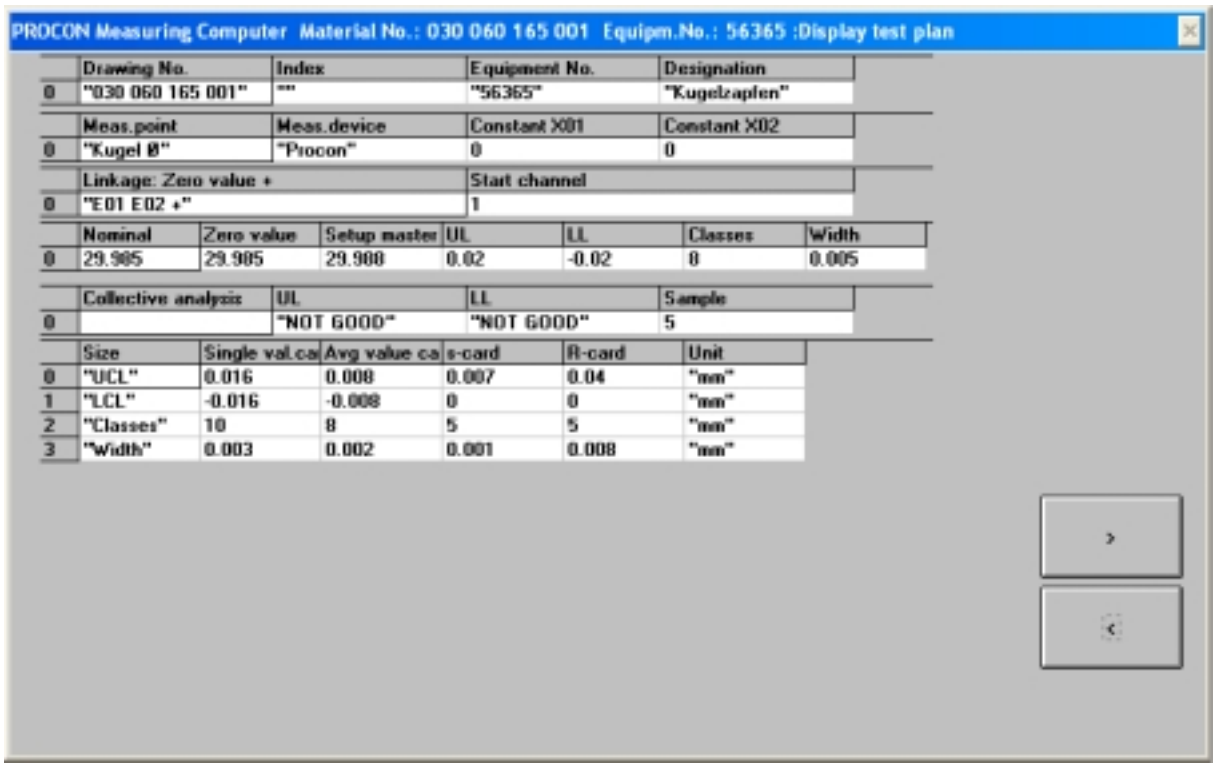
Display test plan


PROCON Measuring Computer Material No.: 030 060 165 001 Equipm.No.: 56365 :Display test plan
Drawing No. | Index | Equipment No. | Designation
0 "030 060 165 001" "" "56365" "Kugelzapfen"
Meas.point | Meas.device | Constant X01 | Constant X02
0 "Kugel Ø" "Procon" 0 0
Linkage: Zero value + | Start channel
0 "E01 E02 +" 1
Nominal | Zero value | Setup master | UL | LL | Classes | Width
0 29.985 29.985 29.988 0.02 -0.02 8 0.005
Collective analysis | UL | LL | Sample
0 "NOT GOOD" "NOT GOOD" 5
Size | Single val.ca | Avg value ca | s-card | R-card | Unit
0 "UCL" 0.016 0.008 0.007 0.04 "mm"
1 "LCL" -0.016 -0.008 0 0 "mm"
2 "Classes" 10 8 5 5 "mm"
3 "Width" 0.003 0.002 0.001 0.008 "mm"
>

With the UP/DOWN function, all available measurement points as well as the further settings may be displayed one after the other.

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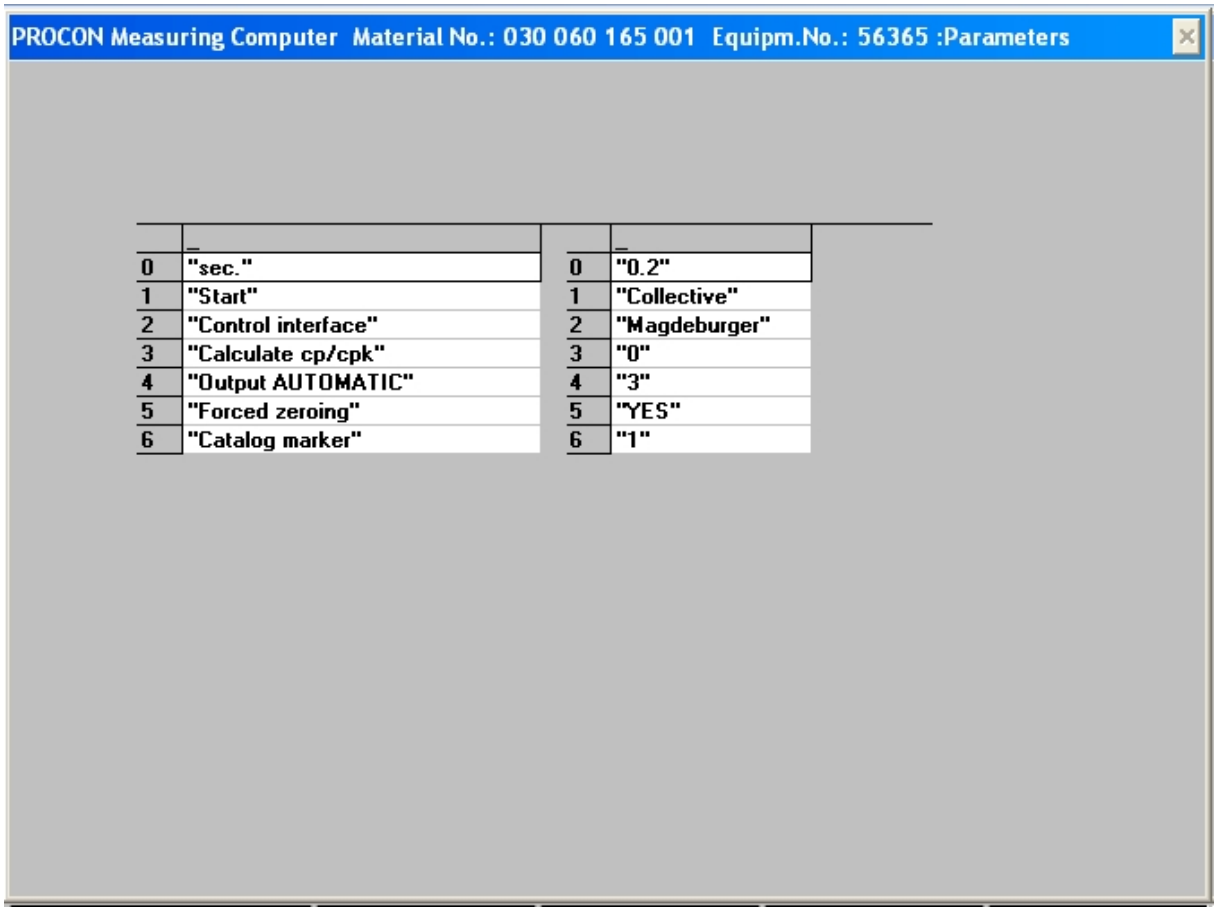
Display test plan (2)



	_
0	"sec."
1	"Start"
2	"Control interface"
3	"Calculate cp/cpk"
4	"Output AUTOMATIC"
5	"Forced zeroing"
6	"Catalog marker"

	_
0	"0.2"
1	"Collective"
2	"Magdeburger"
3	"0"
4	"3"
5	"YES"
6	"1"

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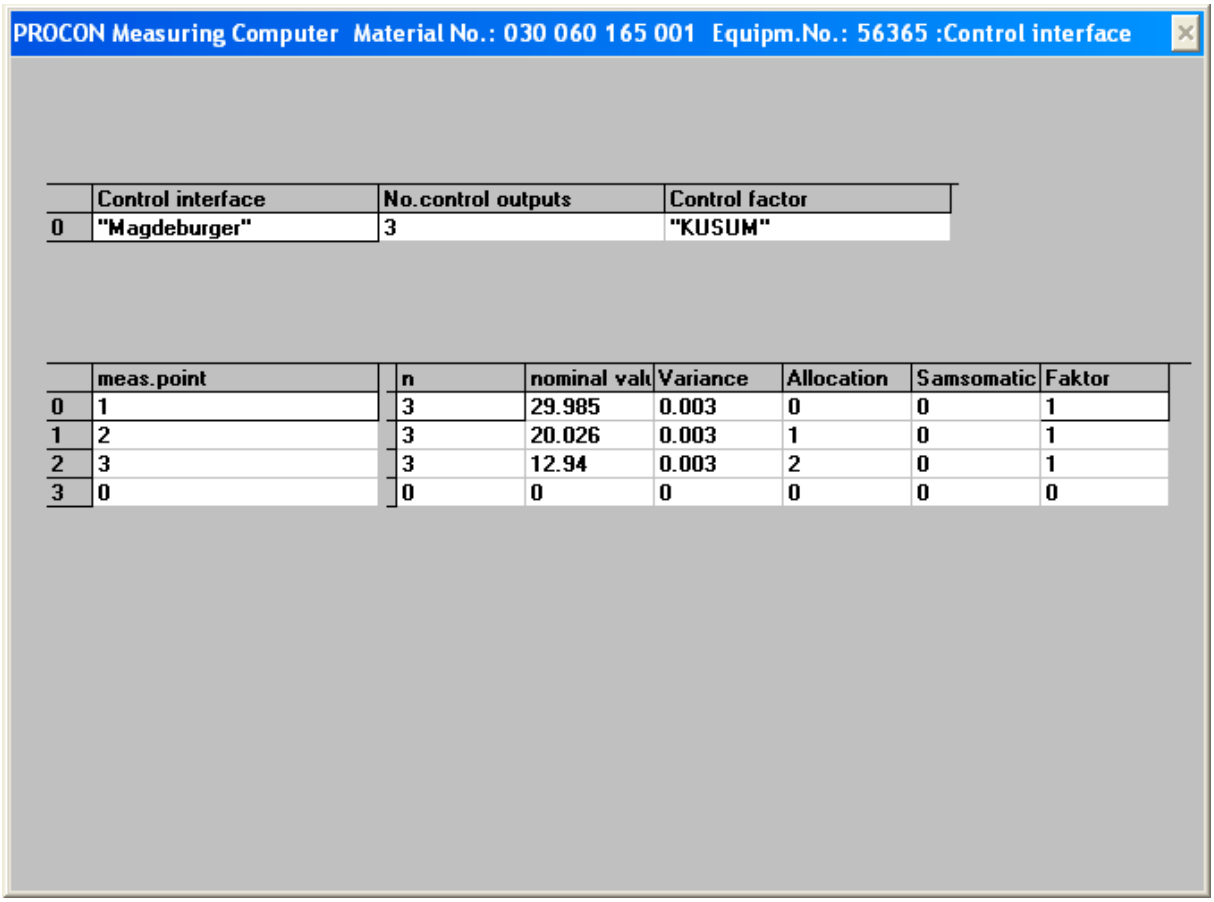
Display test plan (3)



	Control interface	No.control outputs	Control factor
0	"Magdeburger"	3	"KUSUM"

	meas.point	n	nominal valu	Variance	Allocation	Samsomatic	Faktor
0	1	3	29.985	0.003	0	0	1
1	2	3	20.026	0.003	1	0	1
2	3	3	12.94	0.003	2	0	1
3	0	0	0	0	0	0	0

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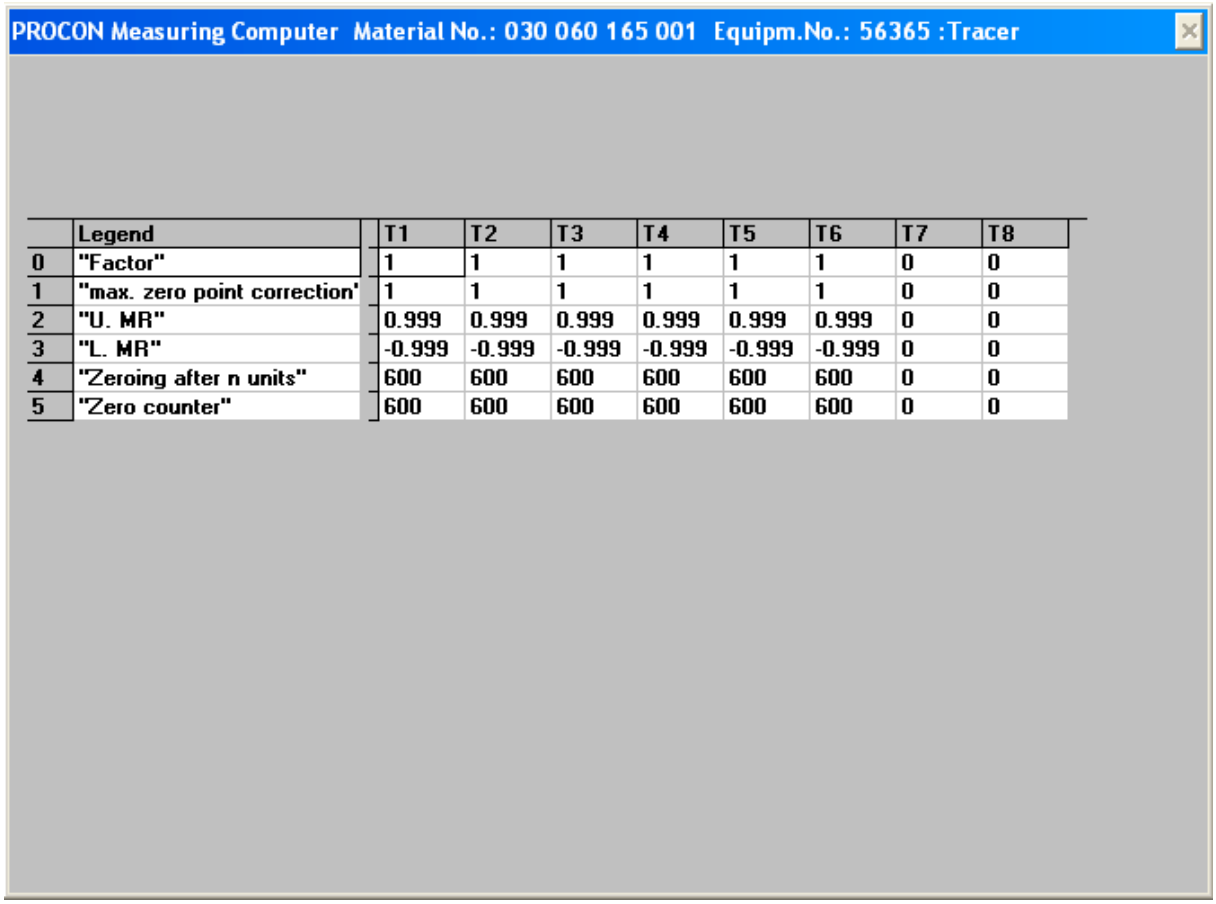
Display test plan (4)



	Legend	T1	T2	T3	T4	T5	T6	T7	T8
0	"Factor"	1	1	1	1	1	1	0	0
1	"max. zero point correction'	1	1	1	1	1	1	0	0
2	"U. MR"	0.999	0.999	0.999	0.999	0.999	0.999	0	0
3	"L. MR"	-0.999	-0.999	-0.999	-0.999	-0.999	-0.999	0	0
4	"Zeroing after n units"	600	600	600	600	600	600	0	0
5	"Zero counter"	600	600	600	600	600	600	0	0

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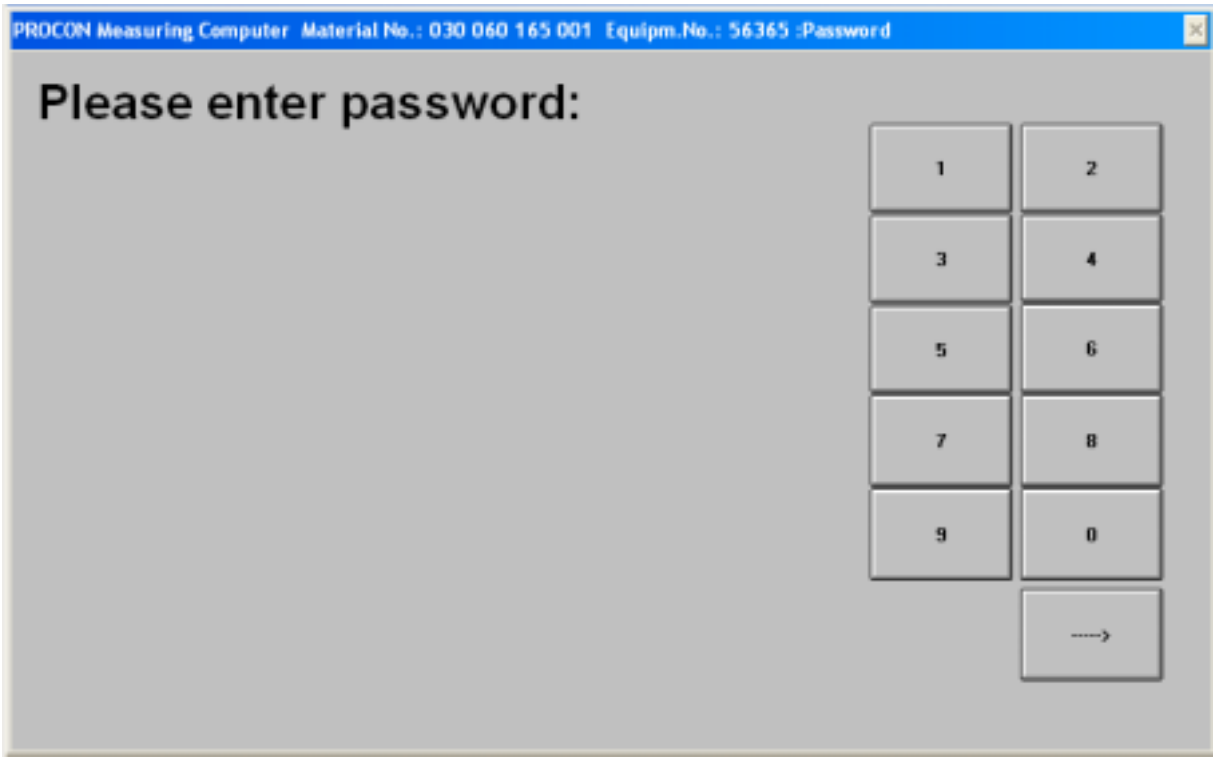
5. Selection of operating mode SETUP

The password window opens. The unit will only switch into the SETUP mode after entering the correct password. If external function keys with AUTOMATIC-SETUP switch are connected, the external switching and the switching via password work equivalently parallel. The operating mode AUTOMATIC is only selected, if both are set on AUTOMATIC.



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6. Operating mode SETUP

Basic settings in operating mode SETUP:

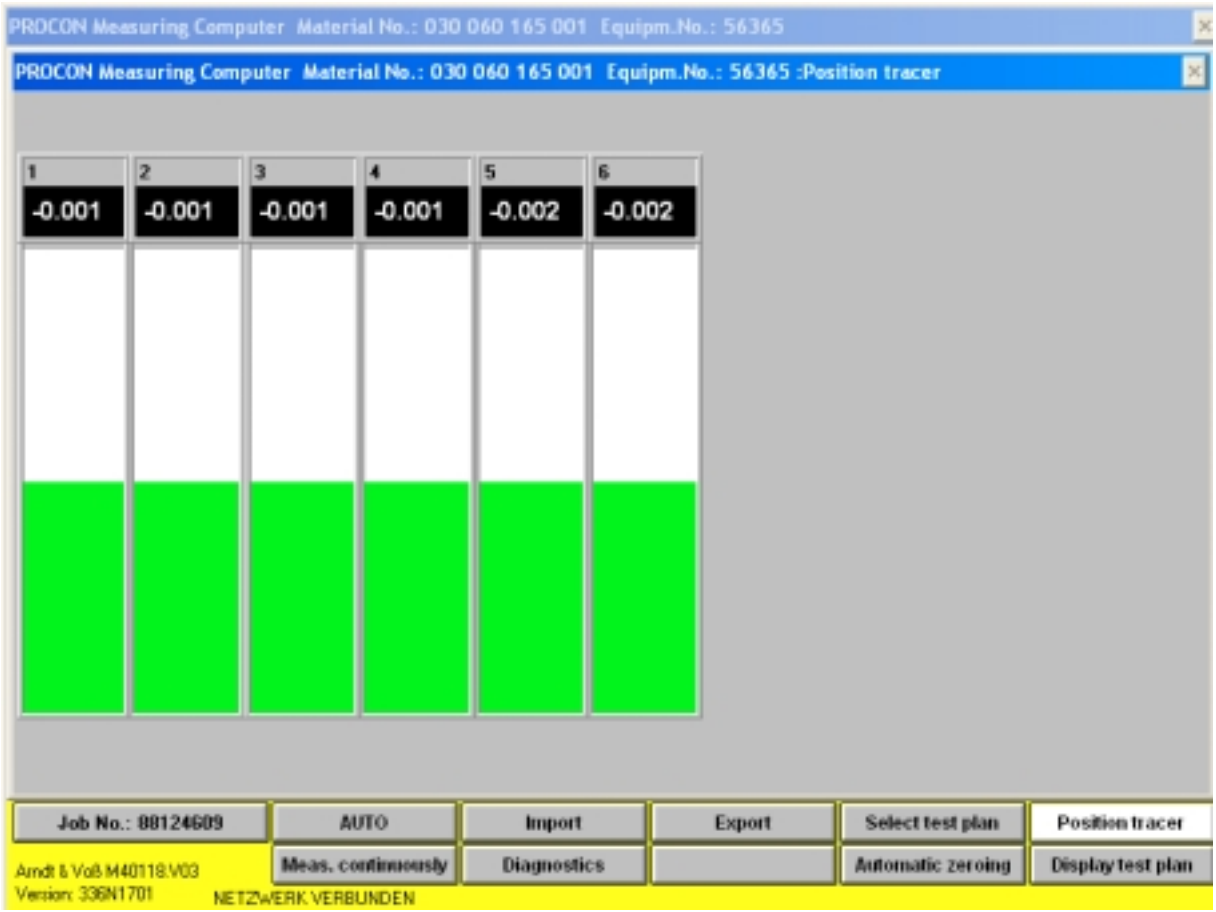
The yellow background indicates the operating mode SETUP.
By pressing the buttons, the required display mode is selected.

Position tracer
This display serves for the approximate adjustment of the tracer.
It is needed for mechanical changes, a change of tracer or if the tracer is no longer in the adjustment range.

Process: Insert setup master
Carry out adjustment for all tracers. The accuracy of adjustment should be at least 1/2 of the correction range (cf. test plan).

Tracer No.: No. of the tracer in the measuring unit, corresponding to the label on the back panel.

Tracer value: Measuring value without consideration of the factor.



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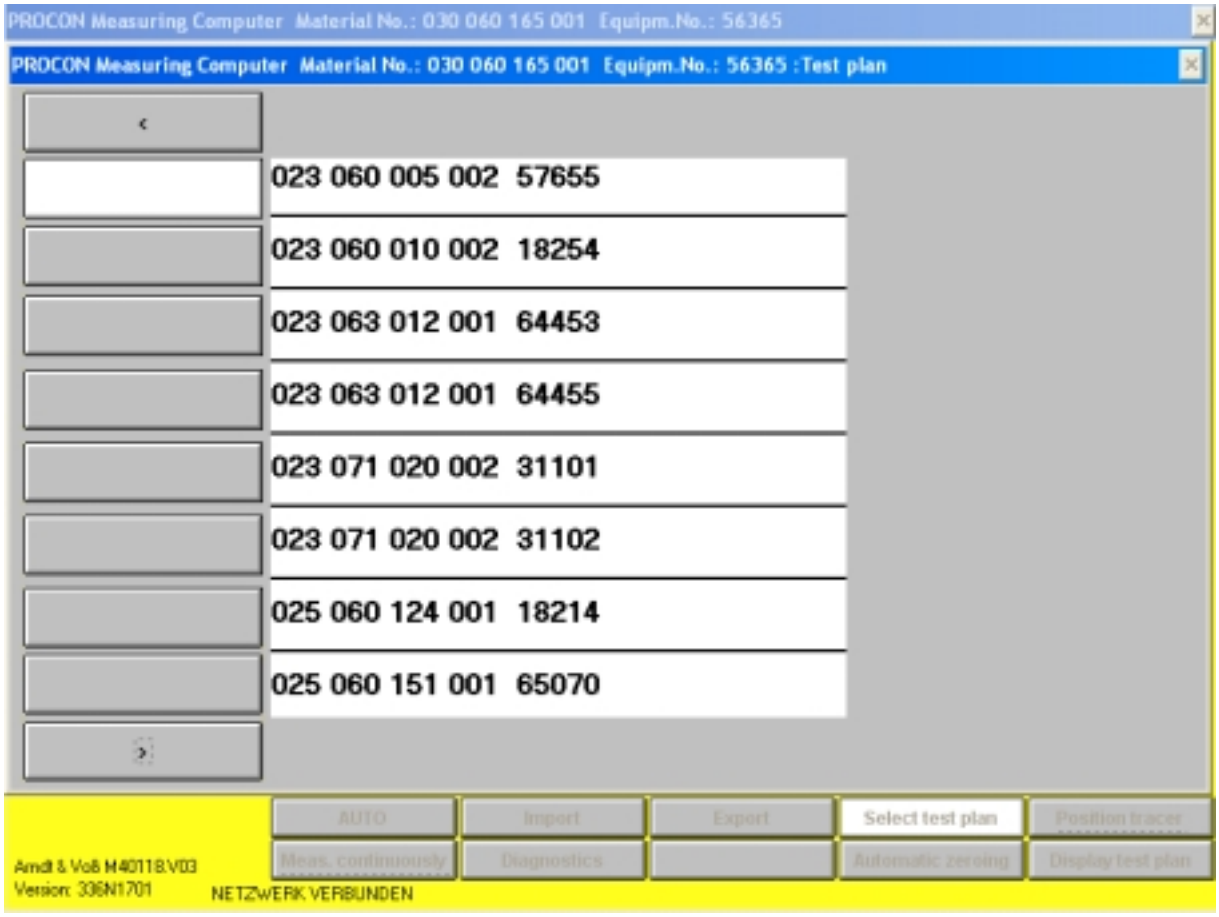
Select or delete test plan

The selection window for test plans is displayed.

The drawing number as well as the machine number or equipment number of the available test plans are displayed.



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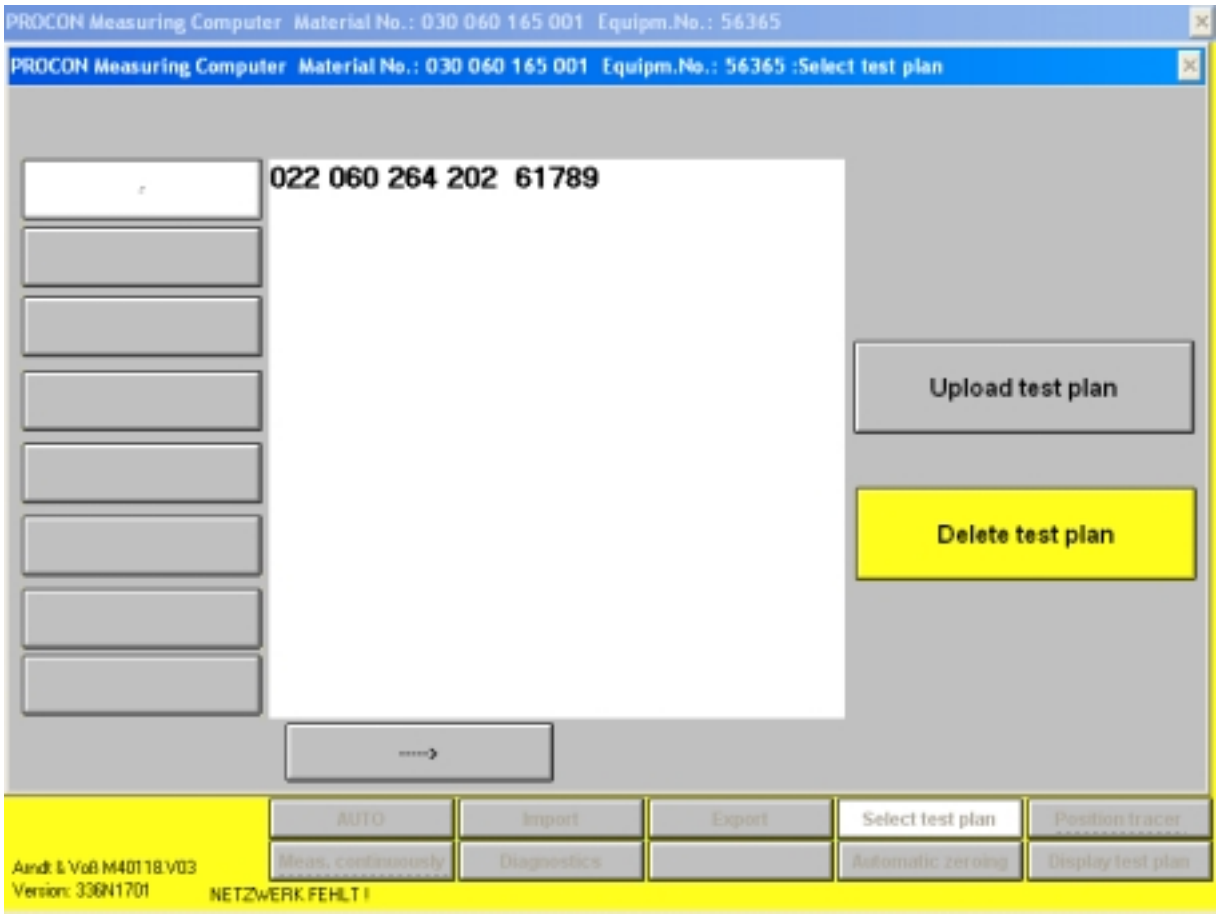
By selecting the required file, the query window Upload/Delete is opened. The respective test plan is either uploaded and activated or deleted.
NOTE: Only active test plans may be deleted.



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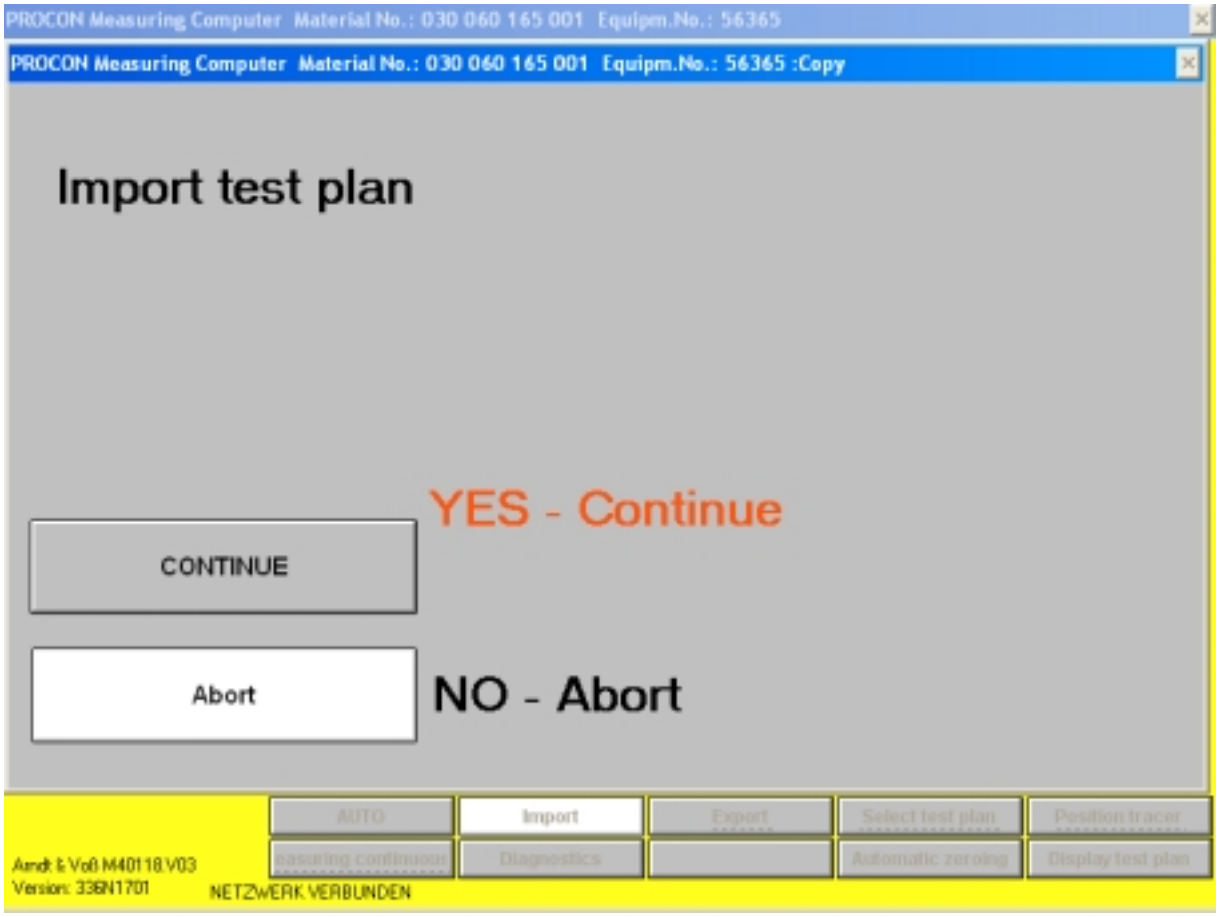
Import test plan/measuring values

A security query is displayed:



Return to the main menu by selecting "ABORT".
By pressing CONTINUE, all test plans available on the external storage device will be imported.

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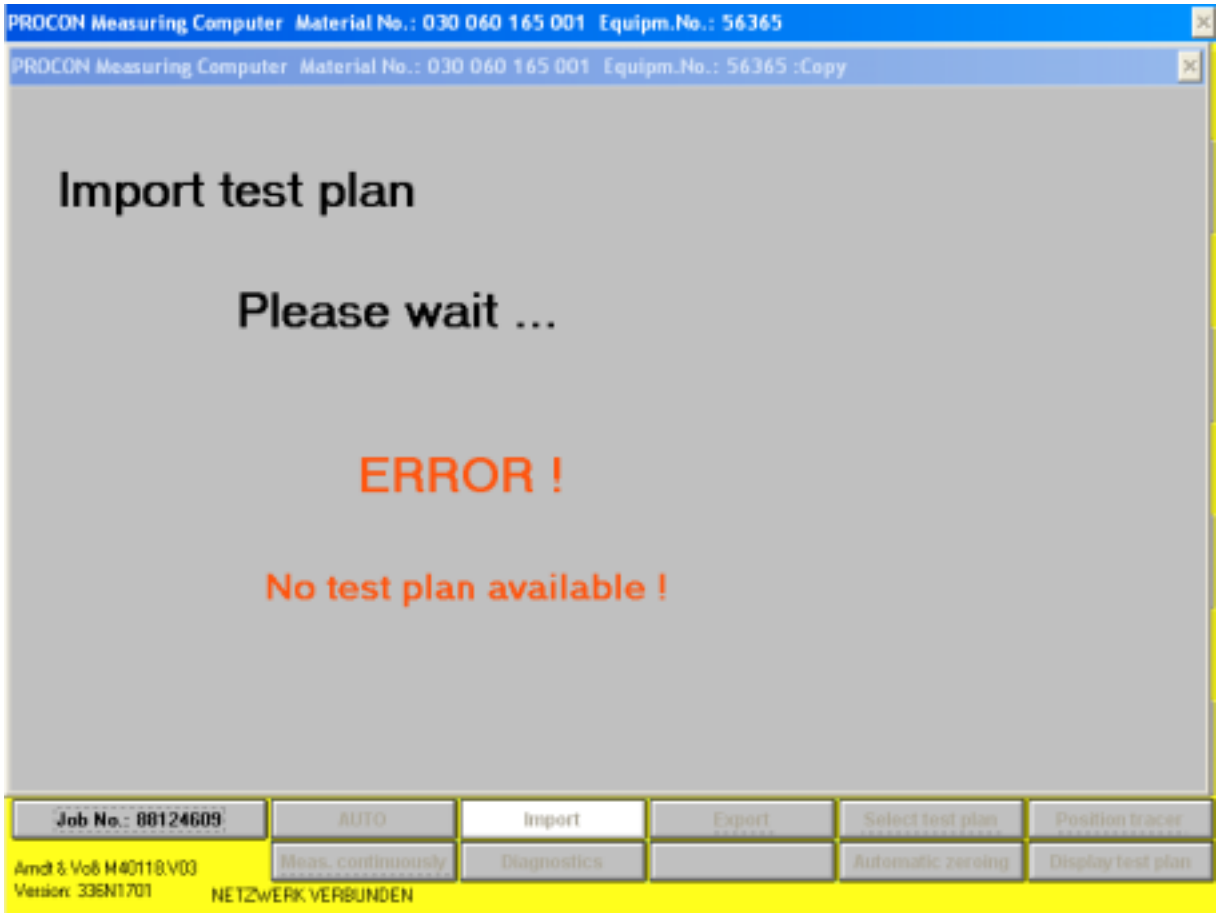
If no test plan is found, an error message is displayed.



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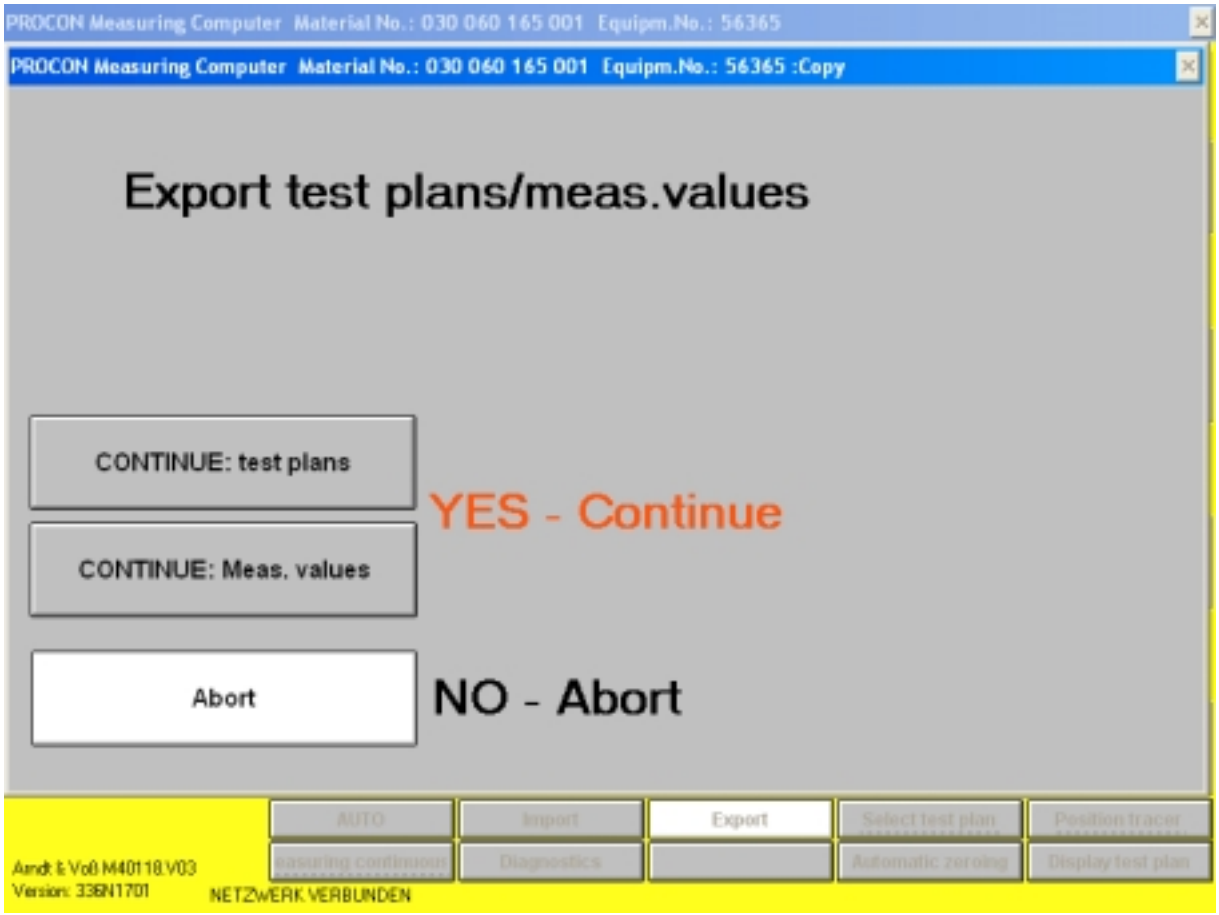
Export test plans/measuring values

All available test plans or all measuring values may be exported.



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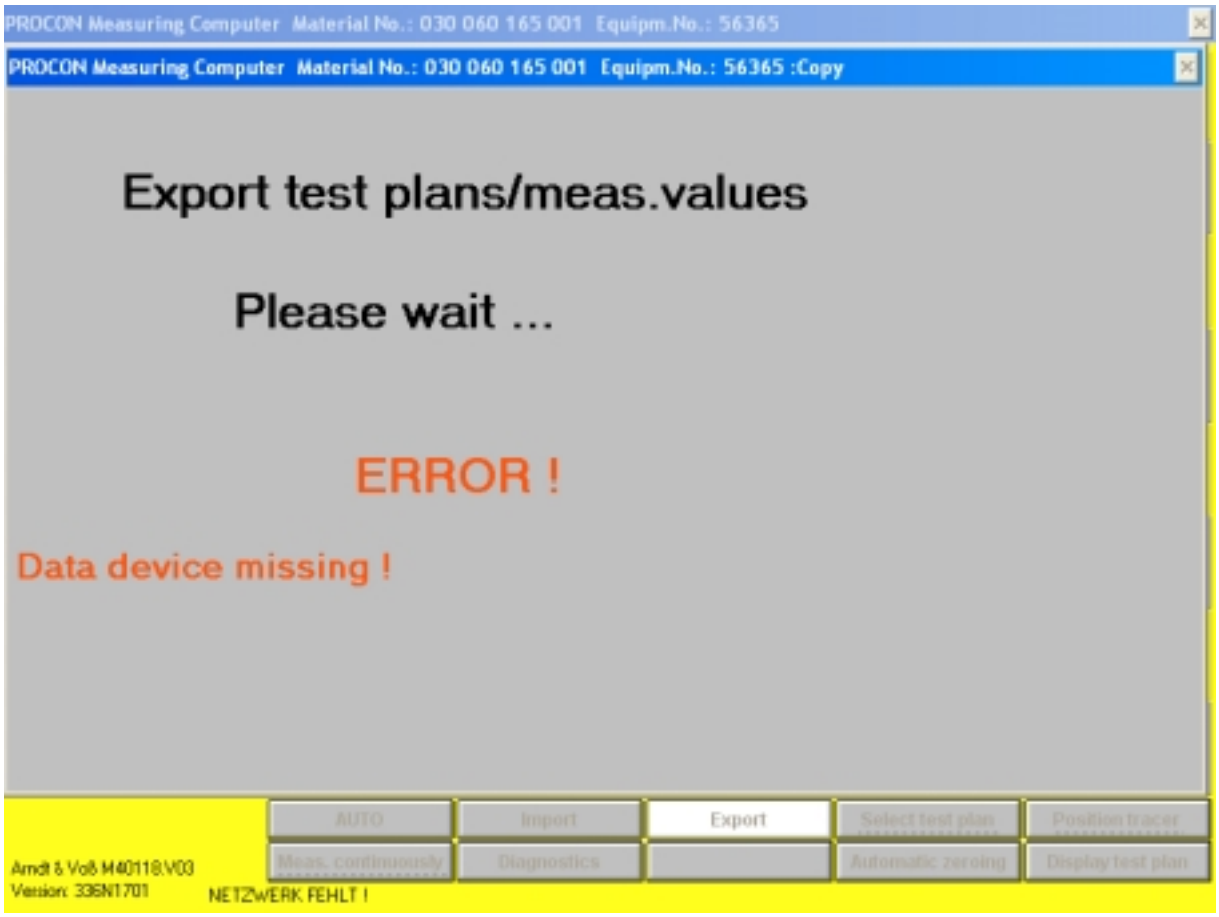
The measuring unit checks if a USB storage device is connected. If none is connected, an error message is displayed. If a USB storage device is connected, the test plans or measuring value files are being exported.
After the files have successfully been saved on the external storage device, all measuring value files will be deleted from the measuring unit. Test plans will not be deleted.



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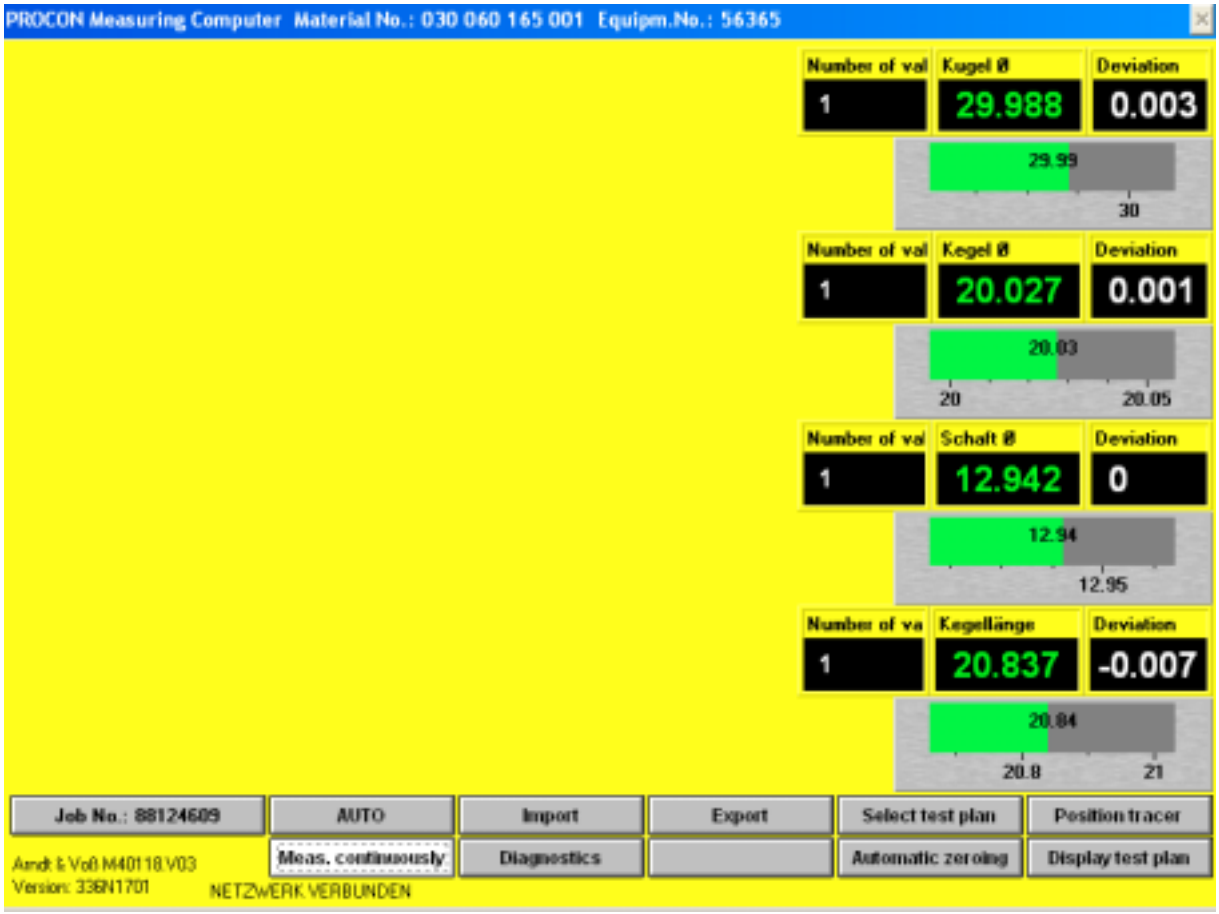
Measuring continuously
Measuring continuously = system check

To check the measuring device or to examine the shape of a work piece, a measurement without signal exchange with the machine is frequently required. **Measuring continuously** provides the measurement with all combinations and consideration of the readjust value of the function automatic zeroing. The result is the same as in the main function AUTOMATIC.



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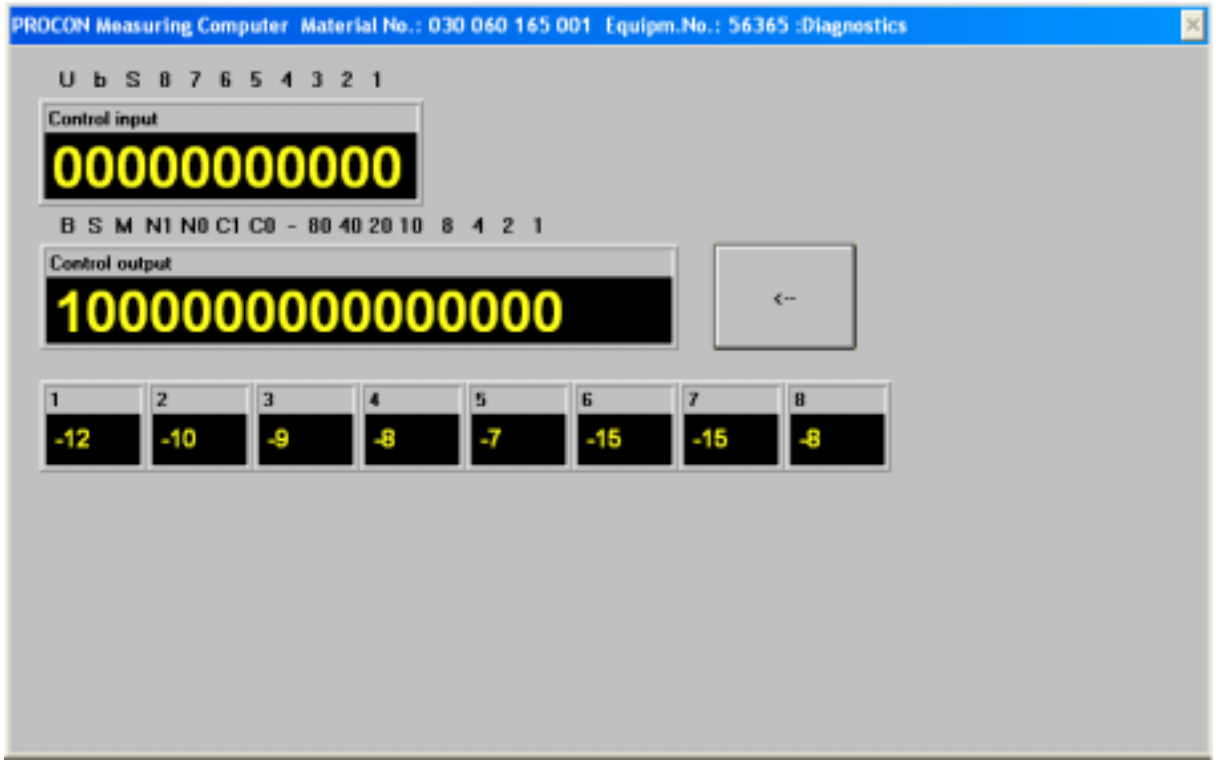
Diagnostics

The status of the control input is displayed (1= ON, 0 = OFF).
Left: Bit 10, Right: Bit 0

The control output may be switched bit by bit with the UP/DOWN function.
Left: Bit 15, Right: Bit 0

The unscaled values of the measuring inputs 1-8 are continuously displayed.



Meaning of the diagnostics bits:

Control input:
1....8: start inputs SINGLE
S: collective start
b: not used
U: acknowledge Index/Neue Magdeburger
Control output:
1,2,4,8: binary readjust value units digit
10,20,40,80: binary readjust value tens digit
-: algebraic sign of the readjust value
C0,C1: code bits 0,1
N0,N1: number of control interface Bit 0,1
M: values for Index/Neue Magdeburger are ready
S: control bit Samsomatic is ready
B: Procon BUSY

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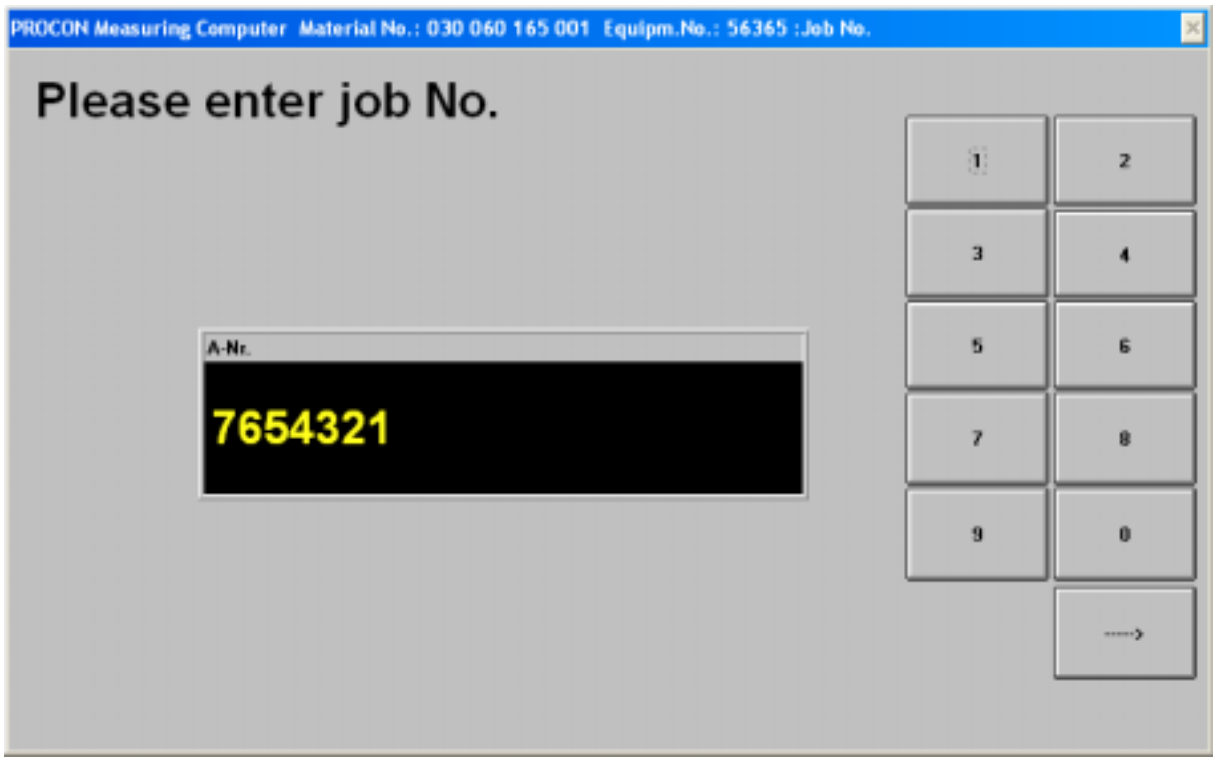
7. Entry of job number

By selecting the job number field, the entry window is opened. After entering and confirming the job number, it is saved and allocated to the subsequent measuring results.
Entering the job number is possible in the operating modes SETUP and AUTOMATIC.



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8. Test plan/measuring value files

Import test plans:
The test plan created in MODAS/ProconNT format has to be in the root directory of the USB storage device. In the measuring computer, the files will be renamed according to the following pattern:
drawing or material number + index or equipment number

Example:
drawing No./material No.: 039.543.123.678; index No./equipment No.: NU132
The file name will be: 339 543 123 678 NU132 (cf. page 19, test plan selection).

Export test plans:
All available test plan files on the measuring computer will be transferred into the root directory of the storage device.

Export measuring value files:
All available measuring value files on the measuring computer will be transferred into the root directory of the storage device. In case a file with an identical name is already available, an error message is shown and the file will **not** be overwritten.
After a successful data transfer, the measuring value files will be deleted from the measuring computer and the measuring value counter will be set to zero.

PPQ5 measuring value format:
File name: same as the corresponding test plan
Ending: CSV

File layout:
Headers (in each measuring value row):

- Material No. or drawing No. (max.18 digits) 026.160.006.515
- Work station or equipment No. (max. 8 digits) 128873
- Measuring device No. (max. 6 digits) 36011 (Will be saved internally in the measuring computer under c:\daten\pmnr.dat)
- Job No. (max. 12 digits) 41069636

Headers and measuring values (Per row the values of one measurement; the explanation row once at the beginning):
Material No.;Job No.;Work station;Measuring device No.;Date/Time;MP1UL;MP1LL;
MP1UCL;MP1LCL;MP1;MP2UL;MP2LL;MP2UCL;MP2LCL;MP2...

MP = measurement point

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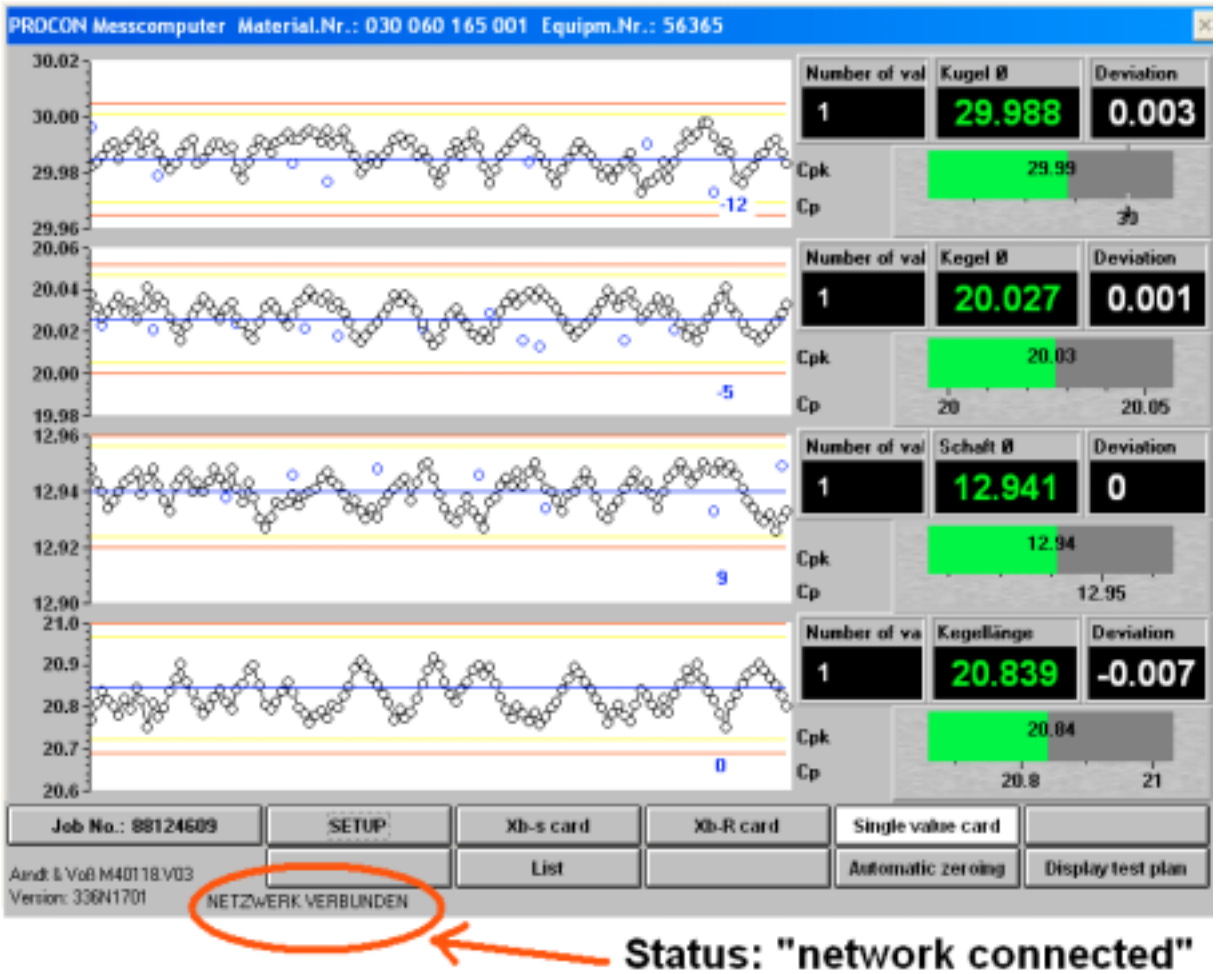
9. OPTION: network connection

Depending on the measuring computer being connected to a network or not, the status "network connected" ("Netzwerk verbunden“) or "no network" ("Netzwerk fehlt“) is shown at the bottom of the display.

Network functions

- Automatic query and transfer of new or changed test plans from the QS server when starting the program or when selecting "Automatic zeroing".
- Automatic saving of measuring values on the QS server under "Upload test plan".



10. Connection schematics

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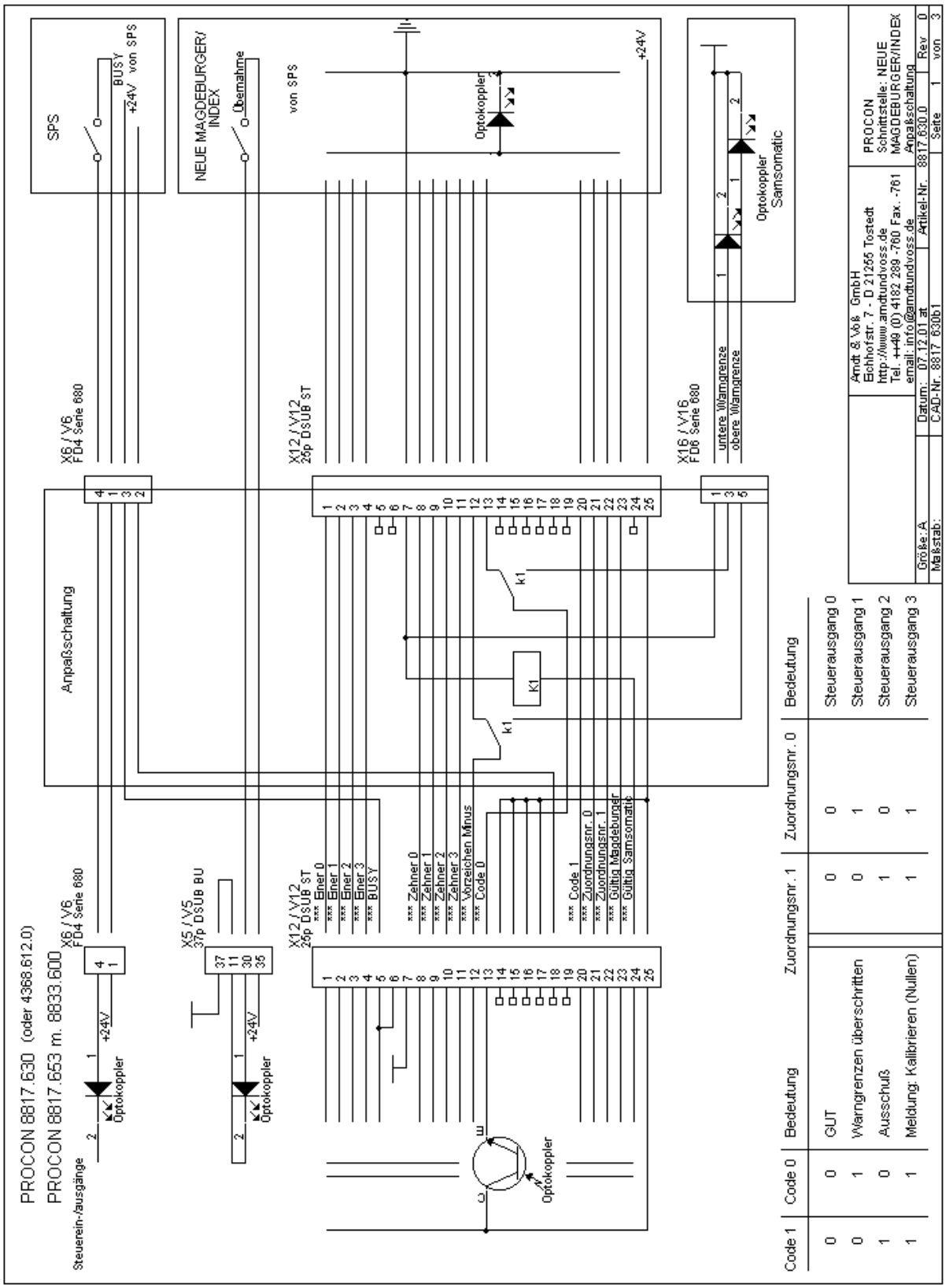

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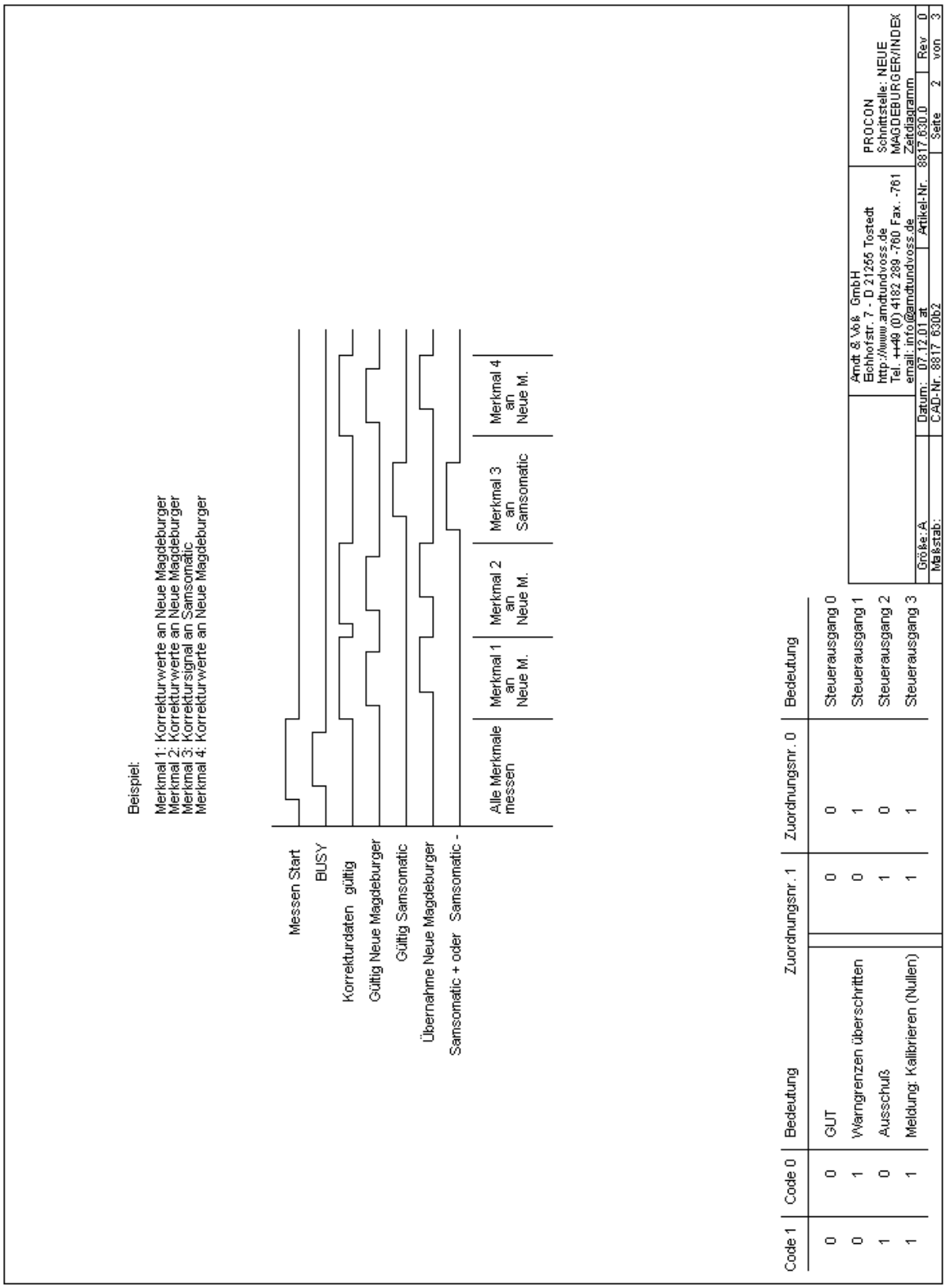

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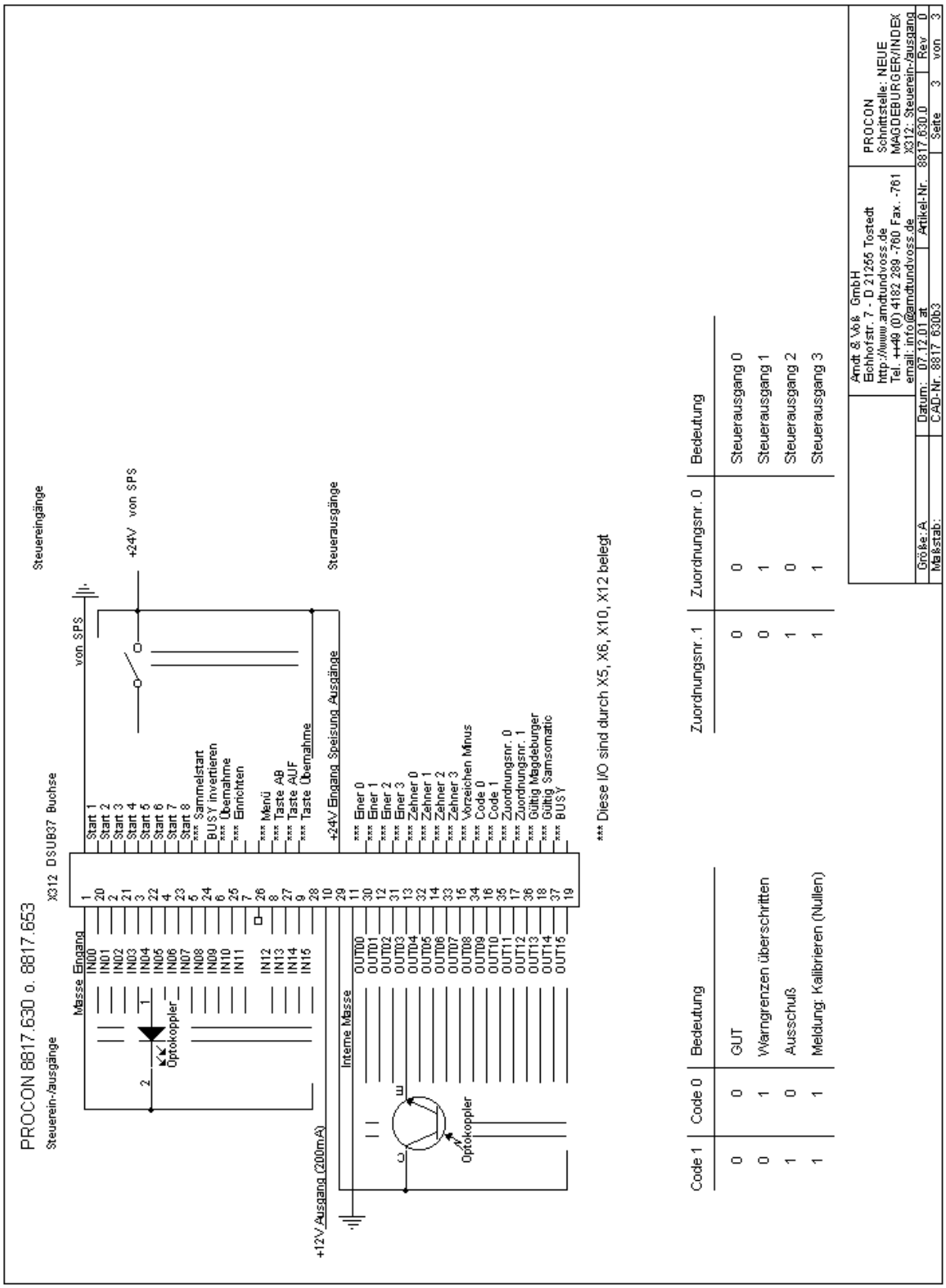

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Security instructions according to VDE 0411

time for warming up	20 minutes
temperature	0...+40 degrees C
atmospheric humidity	up to 75% rel.
frequency	50/60 Hz
power supply voltage	115-230V +10%, -15%
security	according to VDE 0411, protection class 1

This unit was built and checked under DIN 57411 part 1/VDE 0411 part 1 and left the factory in a safe and perfect condition. To preserve this condition and to guarantee a safe working the user has to follow the comments and warnings which are given in these instructions. Before turning on the power, you have to make sure that the voltage of operation and the mains voltage correspond. The mains plug may only be inserted into a socket with ground contact. The safety effect may not be abolished by an extension lead without ground connection. The opening of covers or removing of components, except if it is possible to do by hand, might uncover parts or connections under dangerous voltage. Racks may only be used inside a cover. If an adjustment, a maintenance or a repair at the opened unit under voltage is unavoidable, it may only be done by a qualified employee, who is well acquainted with the dangers involved.

ATTENTION:
After the end of those works, the unit has to be checked according to VDE 0411, part 1. You have to make sure, that only fuses of the given type and values are taken for replacement. The use of mended fuses or short-circuiting them is inadmissible. If it is presumed, that a safe working is not possible, you have to take this unit out of work. Safe work may not be possible, if
– there are visible damages at the unit.
– the unit does not work.
– after longer storage under unfavourable circumstances.
– after heavy stress of transport.

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